REMARKS

Claims 1-15 are in the application as filed. Claim 1 has been amended again to further clarify the invention. Claims 2, 7 and 9 have been cancelled. Claims 16, 17 and 18 were added via a previous amendment.

REJECTION UNDER 35 USC 112

Claims 1-6 and 8-18 were rejected under 35 USC 112. Claim 1 had been amended to properly indicate the average particle size and specifically states that the conductive functional material has an average particle size (D_{50}) of 0.1 to 1.2 microns and that D_{100} is not greater than 5 microns. These quantities are supported in the specification at page 5. The D50 expression means that at least 50% of the particles are in the 0.1 to 1.2 micron range. Support for this notation is on page 5, line 31. This method of describing particle size is well known in the art and the D_{50} and D100 notations are often used in particle science descriptions and would be understood by those skilled in the art.

REJECTION UNDER 35 USC 102 (b)

Claims 1-4-6., 8, 11-13, 15-18 were again rejected as obvious over Lent et al. (5,837,0420 in view of Sasaki (7,217,344)and Hirasa (2003/0166742).

Lent et al. ('420) claims a "jet ink composition suitable for providing a mark on white or light colored substrates, wherein said composition comprises a colorant and an ink carrier and has a viscosity of from about 1.8 centipoises (cps) to about 6 cps at 25.degree. C., an electrical resistivity of from about 20 ohm-cm to about 2,000 ohm-cm, and a sonic velocity of from about 1200 meters/second to about 1700 meters/second, wherein said mark is completely or substantially invisible to the unaided eye and is visible only when excited by ultraviolet light, and said colorant comprises a rare earth metal and a chelating ligand, absorbs at a wavelength of from about 275 nm to about 400 nm, and fluoresces at a wavelength of from about 575 nm to about 700 nm, with the proviso that when the rare earth metal is europium, dysprosium, or terbium, the chelating ligand is not dibenzoylmethane."

Sasaki et al. disclose a "method for forming a composite film comprising: (a) providing a flexible plastic substrate; and (b) depositing a multi-layered conductive metallic film continuously on the flexible plastic substrate by a thin-film deposition technique, the multi-layered conductive metallic film comprising two layers of indium cerium oxide (InCeO), each InCeO layer having a thickness from about 30 nm to about 45 nm, and a layer of an alloy of

18. (Previously submitted) The method of Claim 1 wherein the conductive functional material is selected from the group consisting of gold, silver, copper, nickel, aluminum, platinum, palladium, molybdenum, tungsten, tantalum, tin, indium, lanthanum, gadolinium, ruthenium, cobalt, titanium, yttrium, europium, gallium, zinc, magnesium, barium, cerium, strontium, lead, antimony, and combinations thereof.

silver, palladium, and copper (Ag/Pd/Cu) having a thickness from about 12 nm to about 16 nm and deposited by sputtering a target including 98.0 atomic % silver, 0.5 atomic % palladium, and 1.5 atomic % copper, with the two layers of InCeO surrounding the layer of Ag/Pd/Cu and the composite film having a transmittance of at least about 90% at 550 nm."

Hirasa discloses a recording liquid comprising at least: a pigment (a); and a polymer (b) having one or more types of bond selected from the group consisting of amide bond, urethane bond and urea bond in the molecule, having a weight-average molecular weight of 5000 to 300000 and having an acid value of free acid of not less than 55 mgKOH/g and less than 150 mgKOH/g, the surface tension of said recording liquid being 25 to 54 dyne/cm.

The present invention relates to depositing an ink composition on a substrate by ink jet printing; wherein said composition comprises: (a) conductive functional material;

(e) (b) organic polymer comprising polyvinylpyrrolidone; dispersed in (c) dispersion vehicle selected from organic solvent, water, or mixtures thereof; and wherein the viscosity of said composition is between 5 mPa.s to 50 mPa.s at a temperature of 25 to 35°C wherein the conductive functional material has an average particle size (D_{50}) of 0.1 to 1.2 microns, wherein the D_{100} is not larger than 5 microns and also wherein said composition maintains stability for 24 hours. The present Claim 1 is now amended further to add "firing said ink jet printable composition and substrate

wherein said composition further comprises a monomer, wherein said monomer is ultraviolet curable or thermally curable".

The references cited do not contain the all the limitations mentioned in the present claims nor do they teach them in the quantities mentioned in applicants' claims.

Claim 2 is also rejected under 35 USC 103(a) over Lent et al. in view of Sasaki et al and Hirasa et al. as applied above and in further view of EP 1223201. The examiner sees the difference between Claim 2 of the present application and the Lent et al. in view of Sasaki et al. and Hirasa cases as the requirement for firing in the present application. However, EP 1223201 is cited by the Examiner as teaching a firing step. The Examiner asserts that given the motivation for firing the substrate, disclosed by EP 1223201, it would have been obvious to fire the composition in the present case. Claim 2 has been cancelled and its limitations added to Claim 1.

Claim 3, that adds a surface tension enhancing treatment to the substrate, is also rejected over Lent et al. in view of Sasaki and Hirasa et al. for the reasons given above and

further rejected in view of Grant et al. or Kodas et al. The Examiner argues that Kodas et al. discloses methods of changing surface tension. Applicant argues that Claim 3 as now amended does not teach the embodiments of Lent et al. or other citations.

Claims 1, 4-6 and 8-17 were rejected under 35 USC 103(a) as being unpatentable over De Voeght et al. in View of Hirasa et al., Shimura and Roth.

The Examiner notes that the difference between De Voeght et al. and the presently claimed invention is the particle size limits of the present claims and specific viscosity. However, he cites Hirasa as using particles of a miximum 5 micron size. Roth is cited as teaching curable ink jet ink with a viscosity measured at 25 degrees. By addition of the firing step to Claim 1 these references are avoided. By addition of the limitations of Claim 9 to Claim 1, these references are further avoided.

The Examiner cites EP 1223201, that includes a firing step. EP 1223201 does not, however, teach the other limitations that are now in Claim 1.

Claim 3 was rejected as unpatentable over De Voegt et al, in view of the immediately above references but also in view of Grant and Kodas as earlier applied to the issue of treatments related to surface tension. The Examiner asserts that it would be obvious to treat the substrate of De Voegt et al with the methods of Grant and Kodas to arrive at the current invention. Claims 1, 4-6, 8, 11-13, 15 and 17 were rejected as obvious over Hirasa, in view of Valentini and Shimura. The Examiner asserts that the difference between the three cited patents and the instant claims is the surface tension treatment requirment in the present case. Grant and Kodas are cited again as teaching surface modification. Applicant respectfully disagrees.

None of the references cited above specifically teach the conductive functional material with the present particle sizes and other limitations nor do they teach the embodiment wherein there is added a monomer and the monomer is ultraviolet curable or thermally curable.

It may be true that specific patents teach some aspects of the present invention and others teach other aspects. Chemistry is by its nature an unpredictable art and it cannot be assumed a priori that the combinations that the examiner proposes will operate or produce the improvements taught herein.

In view of the amendments and discussion above, allowance of Claims 1, 3-6 and 8 and 10-18 is respectfully solicited.

If anything further is needed to advance the allowance of this application, the Examiner is urged to contact applicant's attorney at the telephone number below.

Respectfully submitted,

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